What is claimed is:

1. An apparatus for detecting the presence of crystalline material in its *in-situ* growth environment, comprising:

a crystal growing incubator having opposing first and second sides;

an X-ray system, comprising:

an X-ray source disposed adjacent to said first side of said crystal growing incubator, where said X-ray source is configured to irradiate crystalline material grown in said crystal growing incubator; and

an X-ray detector disposed adjacent to said second side of said crystal growing incubator, where said X-ray detector is configured to detect the presence of diffracted X-rays from crystalline material grown in said crystal growing incubator; and

such that in use, crystalline material grown in said incubator can be screened for suitability by said X-ray system, thereby, facilitating the increased reproducibility of successful crystal growth experiments.

2. The apparatus of claim 1, further comprising a positioner that positions said incubator and said X-ray system relative to each other.

3. The apparatus of claim 1, wherein said crystal growing incubator is a sample holding tray that is configured to grow crystals therein.

4. The apparatus of claim 1, further comprising an imaging system disposed adjacent to said crystal growing incubator, where said imaging system detects the presence and location of crystals grown in said incubator, such that in use an X-ray beam emanating from said X-ray source is accurately aligned with crystals detected by said imaging system.

5. The apparatus of claim 1, wherein said X-ray detector is selected from a group consisting of: a charged coupled device (CCD) camera and an imaging plate system.

6. The apparatus of claim 5, wherein said imaging plate system is a phosphor plate imaging system.

7. The apparatus of claim 1, wherein said X-ray detector comprises a detector that provides high sensitivity and a rapid readout.

8. The apparatus of claim 1, wherein said X-ray source emits a monochromatic beam of X-rays consisting of CuKα radiation.

9. The apparatus of claim 1, wherein said X-ray source emits an X-ray beam with a focus size of 200 microns or less.

10. The apparatus of claim 1, further comprising a transmitter that transmits information associated with said diffraction pattern to a remote location.

11. A method of screening for crystalline material in its *in-situ* growth environment, said method comprising the steps of:

irradiating crystalline material in its *in-situ* growth environment with an X-ray beam;

detecting a diffraction pattern from said crystalline material; and

screening said crystalline material for suitability based on said diffraction pattern.

12. The method of Claim 11 wherein the crystalline material is comprised of a group consisting of: a crystalline powder, a microcrystal, a single crystal, and a plurality of single crystals.

13. The method of Claim 11 wherein the diffraction pattern is comprised of a group consisting of: a powder diffraction pattern and a pattern of X-ray diffraction spots.

14. The method of screening for crystalline material according to claim 11, further comprising, prior to said irradiating, positioning said crystalline material and said X-ray beam relative to each another, such that said X-ray beam accurately aligns with said crystalline material.

15. The method of screening for crystalline material according to claim 11, further comprising, prior to said irradiating, determining the presence of said crystalline material in said *in-situ* growth environment.

16. The method of screening for crystalline material according to claim 15, further comprising ascertaining the location of said crystalline material in said *in-situ* growth environment.

17. The method of screening for crystalline material according to claim 16, further comprising storing the location of said crystalline material.

18. The method of screening for crystalline material according to claim 17, further comprising positioning said crystalline material and said X-ray beam relative to each another based on the location of said crystalline material, such that said X-ray beam accurately aligns with said crystalline material.

19. The method of screening for crystalline material according to claim 11, further comprising, prior to said irradiating, positioning said crystalline material and said X-ray beam relative to one another, such that said X-ray beam can accurately irradiate said crystalline material.

20. The method of screening for crystalline material according to claim 11, wherein said method further comprises the initial step of growing crystalline material in a growth environment.

21. The method of screening for crystalline material according to claim 20, wherein said growing further comprises producing crystalline material in said growth environment by a method selected from a group consisting of: a vapor diffusion method, a hanging-drop method, a sitting drop method, a dialysis method, a microbatch method, and a gel crystal growth method.

22. The method of claim 11, wherein said method is performed in space.

23. The method of claim 11, further comprising determining whether said crystalline material is a protein crystal.

24. The method of claim 11, further comprising determining whether said crystalline material is a salt crystal.

25. A method of screening for crystalline material in its *in-situ* growth environment, said method comprising the steps of:

growing crystalline material in a crystal growing incubator;

placing said crystal growing incubator into a positioner;

determining the presence of said crystalline material in said crystal growing incubator;

ascertaining the location of said crystalline material in said crystal growing incubator;

storing the location of said crystalline material;

positioning said crystal growing incubator and an X-ray source relative to each another based on the location of said crystalline material, such that an X-ray beam emitted from said X-ray source accurately aligns with said crystalline material;

irradiating said crystalline material with said X-ray beam;

detecting with a X-ray detector, a diffraction pattern from said crystalline material; and

screening said crystalline material for suitability based on said diffraction pattern.

26. The method of Claim 25 wherein the crystalline material is comprised of a group consisting of: a crystalline powder, a microcrystal, a single crystal, and a plurality of single crystals.

27. The method of Claim 25 wherein the diffraction pattern is comprised of a group consisting of: a powder diffraction pattern and a pattern of X-ray diffraction spots.

28. The method of claim 25, wherein said crystalline material is re-positioned relative to said X-ray beam while said X-ray beam remains stationary.

29. The method of claim 25, wherein said method is performed in space.

30. The method of claim 25, further comprising determining whether said crystalline material is a protein crystal.

31. The method of claim 25, further comprising determining whether said crystalline material is a salt crystal.